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2001 Conservation Requirements for Georges Bank Groundfish Stocks

Report to the Minister of Fisheries and Oceans

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LETTER TO THE MINISTER

May 24, 2001

The Honourable Herb Dhaliwal, P.C., M.P.
Minister of Fisheries and Oceans
200 Kent Street
Ottawa, ON K1A 0E6

Dear Minister,

The Fisheries Resource Conservation Council (FRCC) herewith presents to you its report on 2001 Conservation Requirements for Georges Bank Groundfish Stocks.

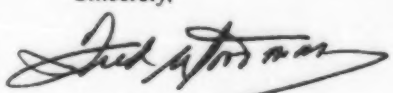
The advice provided is that the catch level on yellowtail flounder should be maintained at 6,000t, that for cod be increased to 2,200t, and that for haddock be increased to 7,200t.

The Council is concerned about the apparent lack of recruitment for 5Zjm cod. However, the spawning stock biomass has continued to increase, albeit slowly due to increasing body growth of older fish. The participants in this fishery substantiate a real increase in cod stock availability. These views, combined with the higher than expected growth in spawning stock biomass, the initial underestimation in recruiting cod in the DFO research vessel survey, and the improved state of 5Zjm haddock suggest that catches of cod can be permitted to allow a mixed cod/haddock fishery. For last year, total removals exceeded the Council's advice. For 2001, total removals of 2,200t remain significantly below $F_{0.1}$ and the Council believes this level of removals will not unduly compromise the stock.

Signs for yellowtail flounder and haddock are more positive, and the Council's advice reflects these generally positive outlooks for these stocks. The recommended levels of total removals should allow the expansion of the age structure of the yellowtail flounder stock. The total removals of 5Zjm haddock, while not as high as advocated by industry, should allow a significant increase in the spawning stock biomass.

During the coming year, as we have outlined previously, the Council will continue its endeavour to develop Fisheries Resource Conservation Plans for Georges Bank groundfish stocks, in consultation with stakeholders, and fisheries managers and scientists.

Sincerely,



Fred Woodman
Chairman

INTRODUCTION

The following discussion and recommendations apply to all three groundfish stocks on Georges Bank, 5Zjm cod, 5Zjm haddock, and 5Zjmnh yellowtail flounder.

As in the past, and again in 2001, industry requested an opening date of June lst for this fishery in order to mitigate potential by-catch problems in the mixed cod and haddock fisheries.

The FRCC recommends that the groundfishery on Georges Bank commence on June 1st, 2001. In the event that plans are not fully in place by the June 1 date, it is advised that the fishery be opened on June 1 on an interim basis.

The FRCC notes this year that joint management coordination discussions with the United States on Georges Bank stocks have not progressed as hoped. Industry representatives nevertheless noted the need for a harmonized management of the Georges Bank stocks by Canada and the U.S. and improved avenues of communication between the Canadian and American principals.

The FRCC reiterates its previous recommendation that Canada and the United States continue discussion with the objective of ensuring continued stock rebuilding by adopting complementary management and conservation measures on both sides of the Hague Line.

FRCC LONG-TERM PLANNING

The FRCC has endorsed the need for longer-term planning for conservation of commercial fish stocks within an ecosystem and precautionary framework. In 2001, the Council plans to continue to engage industry in Scotia-Fundy and the Department toward the development of longer-term conservation plans for Georges Bank groundfish stocks. Pending the adoption of such plans, the Council has constructed its recommendations for 2001 within the context of previously identified stock specific criteria and interim objectives for recommendation setting.

In the interim, the planning process would benefit from an analysis on the historical patterns of cod and haddock abundance levels on Georges Bank.

The FRCC requests that DFO Science make the Council aware of available studies related to patterns of joint cod and haddock abundance on Georges Bank and that DFO Science provide the Council with a report on hypotheses of potential long-term equilibria that could be used to assist in establishing Georges Bank cod and haddock stock targets for long-term planning.

FRCC GEORGES BANK QUESTIONNAIRES

The FRCC requires information from fishermen to assist it in making recommendations to the Minister. Furthermore, the FRCC believes that structuring information from fishermen is indispensable to providing insight into their collective view. To date, information is received mainly from individuals' comments at annual industry-FRCC consultation sessions. This information is compiled by representative Council members and duly reported to full Council during meetings to develop stock recommendations.

The objective to structure feedback from fishermen's observations is twofold: (1) to collect information every year more widely from a greater and more representative sample of fishermen; and (2) to develop fishermen's information as a structured database available to fishermen and to Council as an independent and credible source of stock status information. Toward the objective of collecting a regular, on-going source of fishermen's information, the FRCC has developed a series of questionnaires for fishery participants. These questionnaires are designed to develop a consistent and repeated source of structured data from fishermen.

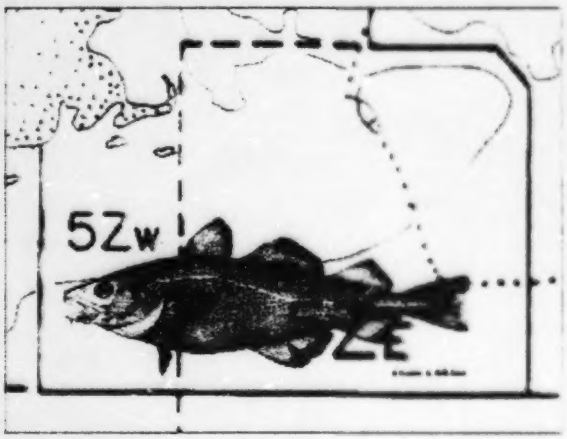
In 2001, low questionnaire participation rates (6 responses or approximately 3% of active fishermen participating in the Georges Bank groundfishery prevented using the questionnaires as a reliable compilation representative of a consensus of fishermen's views on: stock status, ecosystem observations, other fishery data, and feedback on management measures. The FRCC will continue to seek more efficient means of questionnaire design and distribution, follow-up and data collection to increase information response rates.

Feedback from the limited responses to the questionnaires did note that, contrary to recent memory, grey seals (predator species, particularly on cod) were observed on Georges Bank during the 2000 season. Fishermen also observed large amounts of "baitfish" (groundfish prey species, e.g., herring, squid, and sandlance) throughout the season. Mobile gear fishermen reported an abundance of skates in 2000 around the area known as the "yellowtail hole" on Georges Bank.

Environmental Overview

As reported at TRAC, the physical and biological oceanographic conditions examined on Georges Bank indicate that water temperatures since 1998 have been approximately 1 degree Celsius above normal. The degree of mixing as indicated by water between 0 and 50 fathoms of depth has been relatively constant for the past 20 years. The shelf/slope front and Gulf Stream was closer to Georges Bank in 2000 than the long-term normals and the concentration of chlorophyll on the Bank was higher in 2000 than in 1999 or 1998. The abundance of *Calanus finmarchicus* (a common plankton) has been decreasing over Georges Bank since the late 1980s. The temperature conditions that were observed during the 2000 and 2001 Canadian groundfish bottom-trawl surveys are consistent with this pattern. Although recent temperatures are above normal, they are still within the range normally associated with demersal stages of cod and haddock caught within the Georges Bank and Scotian Shelf areas. Connections between the oceanographic conditions, and the status of assessed fish stocks within 5Z are still elusive.

COD - 5ZJ,M



PERSPECTIVE

Fishermen have fished Georges Bank cod since the late 1700s. However, only Canada and the United States of America have had directed fisheries on this stock since 1977. On Georges Bank, cod and haddock are transboundary and are caught together in a mixed groundfish fishery predominantly by longline gear. However, the catchabilities of cod and haddock differ and they are not necessarily caught in proportion to their relative abundance for each gear type.

In the post 1977 period, combined USA and Canada catches peaked at 26,000t in 1982 and declined to their lowest level of 1,800t in 1995 when fishing was restricted to by-catch only. Since 1995 total landings have averaged about 2,600t with Canada accounting for more than two-thirds of landings.

Management of the Canadian fishery has included seasonal closures to all gear sectors from January 1 to May 31 since 1994. Vessels >65' operate under enterprise allocations, mobile gear <65' under ITQs, and fixed gear under individual or community quotas. The U.S. fishery has been constrained by specified area ("Area II") year-round closures since 1995.

In the most recent years, the growth of the Georges Bank cod stock has been hindered by poor recruitment despite a growing adult biomass and low rates of exploitation.

INTERIM STOCK OBJECTIVES

Until such time as a long-term stock conservation plan is developed for this stock, the Council has made its recommendations based on the following interim objectives for this stock:

- total removals based on exploitation below $F_{0.1}$;
- 25,000t interim threshold for spawning stock biomass (ages 3+) to improve the chances of good recruitment;
- an expected annual increase in cod biomass of 5 percent or greater;
- a probability of decline in cod biomass on the order of 20 percent or less; and
- continue to guard against the potential for dumping and discarding in the mixed haddock/cod fishery.

ANALYSIS

Consultations on 5Zjm cod were held in Pubnico on May 7, 2001. Again this year, fishermen expressed the view that the cod stock does not seem to be in as much difficulty as is portrayed in the Stock Status Report (SSR). Fishermen reported continued good catch rates when they directed for cod and significant cod by-catch in directed haddock trips. Despite efforts to keep clear of traditional areas of high cod concentrations in order to fish their higher haddock allocations, fishermen still reported that catch rates of cod continue to be good. This view is more pronounced by fishermen in the fixed gear sector that has traditionally concentrated on cod.

The estimated ages 3+ cod biomass experienced a-year-over-year increase of 14% to 20,000t at the beginning of 2001. This unexpected growth was almost entirely attributed to body growth of fish currently in the stock and not from new cod recruits to the spawning population. The exploitation rate in 2000 was again below $F_{0.1}$ for the second year in a row.

Again this year, the Council continues to be very concerned with the apparent lack of recruitment estimated for this stock. The 2001 SSR notes that the 1997 and 1998 recruiting year-classes are the lowest observed in the series as one year olds and there is continued pessimism for the early observations about the 1999 and 2000 year-classes. In addition, recruitment has been below the 1978 to 1998 average since the 1990 year-class. The increased biomass production from the stock noted above is estimated to be coming almost entirely from somatic (body) growth. Conversely, stock abundance (numbers of cod ages 1+) are

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Cdn. TAC	-	11	12.5	12.5	9	-	15	15	15	6	1	2	3	1.9	1.8	1.6
Cdn. Catch	10.4	8.5	11.8	12.7	7.9	14.4	13.4	11.7	8.5	5.3	1.1	1.9	2.9	1.9	1.8	1.5
U.S Catch	6.7	5.7	4.8	7.6	6.2	6.4	6.8	5.1	4	1.2	0.67	0.77	0.56	0.8	1.2	0.66
Total	17.1	14.2	16.6	20.3	14.1	20.7	20.2	16.8	12.5	6.5	1.8	2.7	3.5	2.7	3	2.2

* All catch data are in metric tonnes (t)

estimated to be declining since 1998. Without question, the lack of perceived recruitment since 1990 and more particularly since 1997 is the major difficulty that prevents a more optimistic view of stock status.

Fishermen on the other hand, feel strongly that research vessel surveys, on which year-class strength of young cod is based, do an inadequate job of catching juvenile fish and concentrate instead on spawning cod. This view may be substantiated by the incidence of nearly 100% mature 2 years olds from the Canadian spring research vessel survey. The relative catch at age in recent years by fishermen on younger fish (ages 2 and 3) has consistently exceeded the predicted catches from the stock assessment. Indeed, in recent stock assessments there has been a tendency to underestimate age 1 and age 2 cod. For example, the estimate of the size of the 1996 year-class has been upgraded each year for the past two years at ages 3 and 4 year olds. The 1995 year-class on the other hand, has been downgraded slightly in 2000 based on lower than anticipated catches of 5 year old cod in 2000. An alternative hypothesis is that catchability of older cod (ages 5+) has systematically decreased while catchability of younger cod (ages 2-3) has increased as a consequence of cod as by-catch in the mixed cod-haddock fishery dominated by haddock. Given the wide split between stock surveys and fishermen's observations, the Council believes that a review of surveys and stock behaviour is warranted to develop enhanced confidence in stock abundance estimates.

Sources

DFO Science

SSR A3-04 (2001) Eastern Georges Bank Cod

FRCC Consultations

The FRCC held consultations on this stock at the Firehall in Middle West Pubnico on May 7, 2001. The meeting began at 2pm and adjourned at 6pm. There were 16 fishermen and association representatives in attendance.

Written Briefs

Inshore Fisheries Limited – Claude d'Entremont (2001-010-00129)
Scotia Fundy Mobile Gear Fishermen's Association – Brian Giroux (2001-010-00131)
Scotia Fundy Inshore Fishermen's Association – Evan Walters (2001-010-00136)
Fixed Gear fisherman – Tim Nickerson (2001-010-00132)
Fixed Gear fishermen – Sanford Atwood, David Link, Russell Atkinson, Philip Jones (2001-010-00130)

Council's Views on Stock Status

Overall Stock Indicator:	stock biomass more than doubled since 1995, while stock abundance (numbers) have been declining since 1996; poor successive recruitment observations are causes for concern
Spawning Biomass:	below the 25,000t minimum threshold on ages 3+
Total Biomass:	below long term average
Recruitment:	1997 through 2000 year-classes lowest recruitment estimates in the time series
Growth and Condition:	weights-at-age show modest trend of lower values for some older ages
Age Structure:	landings again dominated by 1996 year-class at age 4 in 2000
Distribution:	consistent over time
Recent Exploitation Level:	approximately 60% of $F_{0.1}$ since 1999.

The FRCC recommends that: (1) DFO Science review the Canadian spring survey on Georges Bank and based on hypotheses of juvenile and spawning cod, estimate the reliability of the survey to catch juvenile cod in the survey stations and adjust the survey timing and/or sampling stations (e.g., on the edge of the Bank) to test these hypotheses; and (2) consider alternative means of estimating juvenile year-class strength including the possibility to engage fishermen in joint industry/DFO surveys.

Since 1995, reduced exploitation rates and other management measures have facilitated the estimated increase in age 3+ biomass from about 7000t to 20,000t in 2001. However, as in 2000, it is apparent that the objective of an expected 5% year-over-year growth will not be realized in 2001 at the level of total removals in recent years.

However, the Council believes that the catch rate evidence brought forward by individual fishermen, and the consistent views of fixed gear fishermen in particular, substantiate a real increase in cod stock availability to a greater extent than is shown by the stock assessment. The persistent view of fishermen together with the higher than expected growth in 3+ biomass from 2000 to 2001, the initial underestimation of recruiting cod in the surveys, and the improved state of the haddock resource, suggest that catches of cod can be permitted to allow a limited mixed cod/haddock fishery to take place. The Council also recognizes that a limited mixed fishery may prolong the period of recovery for the cod stock. The Council accepts this as a reasonable compromise in the short term in order to ensure feasible fisheries management and to maintain stock information that will enhance the reliability of the stock assessment. Under a limited mixed fishery, the stock status will have to be monitored closely until such time as more substantial cod recruitment is realized and the threshold level of 25,000t for 3+ biomass is reached.

The Council observes that the total removals of 2,234t in 2000 exceeded the Council's advice of 2,000t. At total removals for 2001 as in 2000, the stock status report expects no change in the age 3+ biomass. Total removals in 2001 of 2,200t represent an exploitation rate of approximately 10% or about 60% of the equivalent $F_{0.1}$ exploitation of 17%. Taking fishermen's information into account, the Council believes that this level of total removals in 2001 will not unduly compromise stock abundance.

The FRCC recommends that the total removals of 5Zjm cod for the year 2001 do not exceed 2,200t (combined Canadian/US total removals) and that this level of total removals not be increased until such time that the estimates of ages 3+ biomass threshold of 25,000t is reached.

The Council recognizes that management of the mixed fishery for cod and haddock poses special challenges for managers and industry. As the 5Zjm haddock stock continues to increase, industry and DFO should investigate and implement every reasonable measure to improve the ability of industry to avoid or minimize the catch of cod in the directed haddock fishery on Georges Bank.

The FRCC recommends a continuation of the 100% dockside monitoring program and appropriate at-sea enforcement to prevent dumping and discarding. Timely area and/or fleet closures should be implemented as necessary.

The FRCC recommends that measures be taken to reduce incidental catches of cod in the directed haddock fishery, e.g., through the use of horizontal separator panels on all otter trawls, and appropriate hook sizes in the longline fishery; and the continued use of management/industry subareas for refined management control throughout the fishery.

During consultations, scientists and industry members expressed reservations about the design and implementation of the industry/DFO Georges Bank longline survey. The survey, in its sixth year of operation in 2001, does not fully reflect the general views that the longline sector hold about cod stock status, nor did it correlate well with other abundance indicators from the stock assessment. While the Council supports such joint industry/DFO initiatives, it recognizes that the participants need to believe that the results are reflective of their overall observations.

The FRCC recommends that DFO Science and industry review the industry/DFO Georges Bank longline survey with regard to consistency in protocol and potential use as an index of abundance for future stock assessments and consider, if necessary, changes to the survey to improve its reliability as an indicator of cod stock abundance.

HADDOCK - 5ZJ,M

PERSPECTIVE

The haddock, a bottom dwelling species in the gadoid family, is found on both sides of the North Atlantic. In the western Atlantic, haddock range from Greenland to Cape Hatteras, with a major concentration on Eastern Georges Bank. On Georges Bank, young haddock grow rapidly at first, reaching over 50 centimeters (20 inches) by age 3, but grow slowly after, reaching about 75 centimeters (30 inches) by age 10. Many haddock mature by age 2 but it is uncertain if these young fish successfully produce viable eggs and larvae.

Georges Bank haddock have supported a commercial fishery since prior to 1900. Bottom trawlers have been the principal gear since their introduction in the 1920's. Landings from Georges Bank, which include the eastern Georges Bank component and the Great South Channel component, averaged about 46,000t between 1935 and 1960 and increased to over 100,000t in the 1960's under heavy exploitation. Subsequently, during the early 1970's, spawning season/area closures were introduced as a means of controlling effort and are still in use today. Following the extension of jurisdiction to 200 miles by coastal states in 1977, only Canada and the USA have fished this stock. Both Canada and the USA impose minimum fish size regulations. On Georges Bank, cod and haddock are transboundary resources and are caught together in a mixed groundfish fishery predominantly by mobile gear.

The fishery is closed to all sectors from January 1 to May 31 since 1994. Canadian landings have ranged from about 2000t increasing to 3600t from 1995 to 1999.

INTERIM STOCK OBJECTIVES

Until such time as a long-term stock conservation plan is developed for this stock, the Council has made its recommendations based on the following interim objectives for this stock:

- total removals based on exploitation below $F_{0.1}$;
- 40,000t interim threshold for spawning stock biomass (ages 3+) to improve the chances of good recruitment;
- an expected annual increase in biomass of 5 percent or more;
- a probability of decline in biomass in the order of 20 percent or less; and
- encourage continued effective communication between management and industry to minimize the potential for dumping and discarding in the mixed haddock/cod fishery.

ANALYSIS

Consultations on 5Zjm haddock were held in Pubnico on May 7, 2001. Fishermen's perspective about the status of haddock is compatible with the results of the stock status report. Again this year, stakeholders were pleased with the continued rebuilding of this stock. Industry recommendations for total removals from this stock in 2001 were between 7,800t and 8,000t.

In 2001, it is estimated that the stock has exceeded the interim SSB threshold of 40,000t. The Council recognizes the improvements made in this stock as a result of the conservation measures adopted by industry in recent years and encourages and applauds a continuation of these initiatives.

In 2000, the exploitation rate on fully recruited biomass was 14%, or 70% of the equivalent $F_{0.1}$ exploitation rate of 20%. The spawning stock biomass increased by 25% from 2000 to 2001 due principally to the entry of the 1998 year-class. The outlook for haddock on Georges Bank continues to be good and the population is responding positively to the low exploitation regime and management measures, and industry gear modifications in recent years.

While the biomass has increased substantially since 1993, it still remains below the long-term historical average dating from the 1930s to the 1950s. And, while

Year	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	2000
Cdn. TAC	-	-	-	-	8.2	-	5	5	5	3	2.5	4.5	3.2	3.9	3.9	5.4
Cdn. Catch	3.5	3.4	4.7	4	3	3.3	5.4	4.1	3.7	2.4	2.1	3.7	2.7	3.4	3.7	5.4
U.S Catch	1.7	2.2	1.4	1.7	0.79	1.2	0.95	1.6	0.42	0.29	0.06	0.08	0.11	0.32	0.35	0.19
Total	5.2	5.6	6.1	5.7	3.8	4.5	6.4	5.7	4.1	2.7	2.1	3.7	2.8	3.7	4	5.6

* All catch data are in metric tonnes (t)

Sources: Assessment of Haddock on Eastern Georges Bank. CSAS TRAC WP 2001/005 (Draft) 60p.

conditions have improved, further stock rebuilding and potential long-term gains in productivity are indicated.

Council has difficulties with year-over-year recommendations that would substantially increase total removals from this stock and believes it is prudent to take a more measured approach. Total removals for the entire stock area (5Zjm) of 7,200t is a 20% increase over last year's total removal recommendation. At 7,200t the exploitation rate is expected to be about 75% of the $F_{0.1}$ level of 9,700t and it is expected that this will increase the spawning stock biomass to 2002 by about 10%.

The FRCC recommends that the total removals for 2001 for 5Zjm haddock be set at 7,200t (combined Canadian /US total removals).

Sources

DFO Science

SSR A3-08 (2001) Haddock on Georges Bank.

FRCC Consultations

The FRCC held consultations on this stock at the Firehall in Middle West Pubnico on May 7, 2001. The meeting began at 2pm and adjourned at 6pm. There were 16 fishermen and association representatives in attendance.

Written Briefs

Inshore Fisheries Limited – Claude d'Entremont (2001-010-00129)
Scotia Fundy Mobile Gear Fishermen's Association – Brian Giroux (2001-010-00131)
Scotia Fundy Inshore Fishermen's Association – Evan Walters (2001-010-00136)
Fixed Gear fisherman – Tim Nickerson (2001-010-00132)
Fixed Gear fishermen – Sanford Atwood, David Link, Russell Atkinson, Philip Jones (2001-010-00130)

Council's Views on Stock Status

Overall Stock Indicator	rebuilding toward long-term population levels;
Spawning Biomass:	above the 40,000t threshold;
Total Biomass:	increasing since 1993, currently about two-thirds of long term average level;
Recruitment:	the 1998 year-class appears to be strong and the preliminary information on the 1999 year-class indicates that it is moderate; the 2000 year-class appears to be about equal to the 1998 year-class;
Growth and Condition:	average growth; age 1 survivorship is generally higher than observed during the 1980's;
Age Structure:	broad age structure is reflected in both the fishery and the catch;
Distribution:	similar to recent past;
Recent Exploitation Level:	below $F_{0.1}$ since 1995; approximately 70% of $F_{0.1}$ in 2000.

YELLOWTAIL FLOUNDER - 5ZJMHN

PERSPECTIVE

Yellowtail flounder populations range from Labrador to Chesapeake Bay and are considered relatively sedentary. A major concentration of yellowtail flounder occurs on Georges Bank to the east of the Great South Channel. While tagging work indicates limited movement from Georges Bank to adjacent areas, knowledge of seasonal movement of yellowtail flounder on Georges Bank is poor. The stock is estimated to be distributed equally on either side of the Hague Line.

On Georges Bank, spawning occurs during the late spring period peaking in May. It appears that spawning occurs on both sides of the international boundary. Yellowtail flounder appear to have variable maturity schedules, with age two females considered 40% mature during periods of high stock biomass to 90% mature during periods of low stock biomass.

Total catches of Georges Bank yellowtail flounder reached almost 20,000t in the late 1960s. The Canadian directed fishery for yellowtail flounder is a relatively recent development, with significant catches first occurring after the introduction of specialized gear in 1993. In 1994, with about 40 vessels pursuing the Canadian fishery there was a catch of 2,142t. Under quota control for the first time in 1995, Canadian catches were 495t against a quota of 400t. The combined Canada-USA total removals have been increasing since 1995, and in 2000 were 6,848t with Canada taking 2,812t of its 3,000t quota.

The Canadian fishery is mainly pursued using otter trawl gear from vessels less than 65'. The Canadian fishery occurs in a relatively limited portion of Georges Bank known as the Yellowtail Hole (5Zm), and with current management restrictions, operates in the latter half of the calendar year only (June to December). The United States fishery operates primarily in the southwest triangle outside of closed Area II. US catches concentrated in this area increased from 2,471t in 1999 to 4,036t in 2000. Both Canada and USA employ the same management unit and share jointly in the assessment of the stock.

INTERIM STOCK OBJECTIVES

Until such time as a long-term stock conservation plan is developed for this stock, the Council has made its recommendations based on the following interim objectives for this stock:

- total removals based on exploitation below $F_{0.1}$;
- an expected annual increase in spawning stock biomass of 5 percent or more;
- a probability of decline in biomass on the order of 20 percent or less; and
- expansion of the age structure into the older ages of the population.

ANALYSIS

In 2000, the exploitation rate on fully recruited biomass was 10%, one-half the equivalent $F_{0.1}$ exploitation rate of 20%. In 2001, the spawning stock biomass has virtually doubled since 1999 in part due to the very large 1997 year-class. The outlook for yellowtail flounder on Georges Bank continues to be good and the population is responding positively to the low exploitation regimes.

Mobile gear fishermen reported that while yellowtail geographic range was increasing, catch rates in the Yellowtail Hole had decreased significantly in 2000 compared to previous years. More yellowtail were caught in haddock trips and outside the Yellowtail Hole in 2000. Fishermen observed higher by-catches of skates that interfered with the directed fishery and forced effort to move west along the Hague Line. In 2000, a larger proportion of males (the smaller of the sexes) were caught in comparision with previous recent years. Industry advised that the FRCC maintain status quo removals of 6,000t for 2001.

The phenomenal rate of increase observed in this stock over the last two years is not expected to continue in the future. Recent recruitment is strong relative to the

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Can. TAC	-	-	-	-	-	-	-	-	-	-	0.4	0.4	0.8	1.2	2	3
Can. Catch	0	0	0	0	0	0	0	0	0.7	2.2	0.8	0.48	0.81	1.2	1.9	2.9
U.S Catch	2.5	3.1	2.9	2.1	1.2	3.6	2	4.7	3.2	1.7	0.31	0.8	1	1.9	2.5	4
Total	2.5	3.1	2.9	2.1	1.2	3.6	2	4.7	3.9	3.9	0.8	1.3	1.8	3.1	4.4	6.9

*All catch data are in metric tonnes (t)

Source: Stock Assessment of Georges Bank (5Zjmnh) Yellowtail Flounder for 2001. CSAS TRAC WP 2001/003 (Draft) 86p.

1980s. and the 1997 year-class that dominated the fishery in 2000 continues to be the strongest since 1973. The 1997 year-class is expected to contribute 40% to the exploitation in the 2001 fishery and it represents nearly one-third of the estimated total start of year biomass in 2001.

Total removals of 6,000 t in 2001 would result in a low probability that the biomass will decline in 2002. This catch level allows expected growth in biomass of approximately 15% and an exploitation rate of 15%, three-quarters the equivalent $F_{0.1}$ exploitation rate of 20%.

The FRCC recommends that total removals for 5Zjmnh yellowtail flounder in 2001 be maintained at 6,000t.

The FRCC notes that the ageing data required for the stock assessment came from US age-length key sources. This underlies a lack of ageing information and a concern about the few older age groups in the population. A consequence of the large 1997 year-class is an opportunity to expand the age structure in the population by increasing the percentage of older fish in the population. The FRCC noted that continued low levels of sampling and absence of age information have compromised reliability of the stock assessment results. The FRCC is pleased to note that a DFO Science yellowtail ageing workshop took place in St. John's in the Fall of 2000 and encourages this work toward improving Canadian ageing capability to support age-structured stock assessments.

The FRCC recommends that increased yellowtail flounder ageing work be continued to improve the reliability of stock assessment results.

Sources

DFO Science

SSR A3-15 (2001) Yellowtail flounder on Georges Bank.

FRCC Consultations

The FRCC held consultations on this stock at the Firehall in Middle West Pubnico on May 7, 2001. There were 16 fishermen and association representatives in attendance.

Written briefs

Inshore Fisheries Limited, Claude d'Entremont (2001-010-00129)

Scotia Fundy Mobile Gear Fishermen's Association – Brian Giroux (2001-010-00131)

Council's Views on Stock Status

Overall Stock Indicator:	rebuilding and close to being rebuilt
Spawning Biomass:	increasing slightly at high levels
Total Biomass:	leveling off at high levels
Recruitment:	moderate/strong year-classes in 1990's: the 1997 year-class estimated to be strong at over 70 million fish – highest estimated in the time series
Growth and Condition:	increasing trend from 1996 to present
Age Structure:	limited but expanding
Spatial Distribution:	expanding survey results: Canadian fishermen report more difficult to catch in traditional areas: US fishery increased in southwest triangle Area II.
Recent Exploitation Level:	one-half of $F_{0.1}$

Yellowtail by-catch in the scallop fisheries on Georges Bank that operated throughout the year continues to be an unresolved issue for fishermen. Information provided to TRAC on the location of scallop catches on Georges Bank seemed to indicate that scallop catches generally did not occur around the traditional yellowtail grounds (e.g., the Yellowtail Hole). However, the greater dispersion of the yellowtail effort and catches in 2000 was not captured in the location data.

In order to ensure the conservation of this resource, the FRCC recommends that information on yellowtail flounder catches in the Canadian scallop fishery be tabled and incorporated in the next stock assessment.

Appendix 1: Letter to Stakeholders and Questionnaire

LETTER TO STAKEHOLDERS

March 1, 2001

Dear Stakeholder,

RE: Georges' Bank 2000 Fishery Questionnaire

Please find attached a questionnaire to provide feedback to the FRCC on your experience in the Georges' Bank fishery of 2000.

The FRCC requests that participants in the 2000 Georges' Bank groundfishery take a few minutes to complete the questionnaire. As well, any comments and suggestions toward formalizing information the FRCC receives from fishermen are most welcome.

This questionnaire has been developed as a continuing means of providing more structured information on fishing industry observations on the Georges' Bank fishery. It is designed to make it easier for respondents to provide feedback on their observations in the fishery by simply checking the most appropriate boxes in response to questions on stock status and fisheries observations. It is estimated that all respondents can complete all questions in less than 10 minutes. As such, it is our objective to have as many people as possible complete the form in order to obtain a complete industry view of the Georges' Bank groundfish stocks.

We believe that fishermen's information gathered in this form will develop much needed structure to the industry's consensus view of stock status, and together with other sources of information, will provide important rationale to the FRCC's recommendations to the Minister of Fisheries and Oceans. As in the past, the FRCC will make the summary information from this questionnaire publicly available.

Completed questionnaires can be sent:

By FAX: (613) 998-1146
By mail: P.O. Box 2001, Station D, Ottawa, ON K1P 5W3
By e-mail: **sheehant@dfo-mpo.gc.ca**
By hand: FRCC Consultation, May 7, Pubnico Fire Hall, Pubnico Nova Scotia

An electronic version of the questionnaire can be found on the FRCC website at: **www.dfo-mpo.gc.ca/frcc**. Completed questionnaires should be received by the FRCC prior to April 30, 2001.

Thank you in advance for your feedback and your contribution toward better understanding the status of our groundfish resources on the Georges' Bank.

Yours truly,

Fred Woodman, Chair – FRCC

Questions to Participants in the 2000 Georges Bank Groundfishery

The FRCC requests the following information as an important part of its information sources for determining stock status of the Georges Bank groundfish resources of cod, haddock, and yellowtail flounder. Once compiled, this information is used to assist the FRCC in making recommendations to the Minister of Fisheries and Oceans for the year 2000 fishery.

Instructions to participants: Please complete the following questions by checking off the appropriate box (✓) in the tables below. Additional written comments are welcome. The questionnaire should take about 5 to 10 minutes to complete. Thank you in advance for your valuable input.

1. Stock Status

1. What is your view of the **overall status in 2000** of groundfish stocks on Georges Bank?

	Fully recovered	Improving compared to 1999 but not fully recovered	Stable-unchanged from 1999	Declining compared to 1999	Stock in collapse
5Zjm Cod					
5Zjm Haddock					
5Zjmnh Yellowtail flounder					

2. How did your own **catch rates in 2000** compare with your catch rates of 1999?

	Highest ever	Better than 1999	Unchanged from 1999	Worse than 1999	Lowest ever	Did not fish stock
5Zjm Cod						
5Zjm Haddock						
5Zjmnh Yellowtail flounder						

3. How **available were fish in 2000** compared with fish availability in 1999?

	Easy to find	Easier to find than 1999	Unchanged from 1999	More difficult to find than 1999	Difficult to find	Did not fish stock
5Zjm Cod						
5Zjm Haddock						
5Zjmnh Yellowtail flounder						

4. How did the **timing of the fishery in 2000** compare with the timing of the fishery in 1999?

	Very early	Earlier than 1999	Unchanged from 1999	Later than 1999	Very late	Did not fish stock
5Zjm Cod						
5Zjm Haddock						
5Zjmnh Yellowtail flounder						

5. What was the **overall condition of fish (fat or skinny) in 2000** catches compared to fish condition in 1999?

	Excellent fish condition	Improved condition compared to 1999	Unchanged condition from 1999	Declining condition compared to 1999	Poor fish condition	Did not fish stock
5Zjm Cod						
5Zjm Haddock						
5Zjmnh Yellowtail flounder						

II. Observations while Fishing in 2000

1. How would you evaluate the **overall status of the Georges Bank ecosystem in 2000** (e.g., environmental conditions, water temperature, presence of other species, etc.)?

	Highly positive	Better than in 1999	Unchanged from 1999	Deteriorated compared to 1999	Highly negative
Georges Bank ecosystem					

Please state evidence from indicators you observed in support of your response: _____

_____

_____

2. Did the presence of **predator species** on groundfish have an impact on the fishery in 2000?

	High abundance of predators	Increased predators compared to 1999	Unchanged predators from 1999	Decreased evidence of predators compared to 1999	Relative absence of predators
Predator species					

Please state evidence of predator abundance you observed in support of your response: _____

_____

_____

3. Did the presence of **prey (forage) species** (e.g., sandlance, herring, shrimp, etc.) for groundfish have an impact on the fishery in 2000?

	High abundance of prey	Increased prey compared to 1999	Unchanged prey from 1999	Decreased evidence of prey compared to 1999	Relative absence of prey
Prey species					

Please state evidence of prey abundance you observed in support of your response: _____

_____

4. How would you evaluate the **size of fish** in catches by stock in 2000?

	Many more small fish	More small fish than usual	Similar in ages and size to past years	More big fish than usual	Many more older, big fish	Did not observe
5Zjm Cod						
5Zjm Haddock						
5Zjmnh Yellowtail flounder						

5. Yellowtail flounder and skates share the same habitat. Do you feel that the **presence of skates in the yellowtail fishery** affects yellowtail catch rates and yellowtail spatial distribution?

	Affects a lot	Affects somewhat	Uncertain	Affects a little	Does not effect at all
Presence of skates in the yellowtail fishery affects yellowtail catch rates					
Presence of skates in the yellowtail fishery affects yellowtail spatial distribution					

Suggestions to improve monitoring effectiveness: _____

_____

_____

6. Do you believe that **increased use of management measures other than TACs**, e.g., more area closures for protecting spawning fish, or more gear restrictions to reduce bycatch (e.g., separator trawls or hook size and type) **would be effective** in dealing with groundfish stock conservation and rebuilding on the Georges' Bank?

Increased use of Other management measures	Could be very Effective	May be partly effective	Uncertain	Will likely be less than fully effective	Will not be at all effective
1. More Area closures					
2. More Gear restrictions					
3. Stricter Small fish protocol					

Suggestions regarding management measures other than TACs: _____

_____

_____

III. Information Sources

1. In your view, do the following **fishery information sources** accurately reflect stock removals and provide the means for estimating stock status?

Information Source	Highly underestimates stock removals	Somewhat underestimates stock removals	Reflects removals accurately	Somewhat overestimates stock removals	Highly overestimates stock removals	No comment/ Don't know
1. Port sampling						
2. At-sea sampling						
3. Sales slip data						
4. Quota statistics						

Suggestions to improve the reliability of fishery information: _____

_____

_____

2. In your view, do the following **stock abundance surveys** accurately reflect year-over-year changes in actual stock abundance?

Stock Surveys	Highly underestimates abundance	Somewhat underestimates abundance	Reflects stock abundance accurately	Somewhat overestimates abundance	Highly overestimates abundance	No comment/ Don't know
1. Research vessels surveys, e.g., DFO						
2. Joint Industry/DFO surveys						
3. Sentinel surveys						
4. Individual opinions of fishermen						

Suggestions to improve the reliability of fishery information: _____

_____

_____

_____

3. Do you feel you have had an **adequate opportunity to express your views on stock status through the various meetings listed below?**

Meetings	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree	No comment
1. Scotia-Fundy RAP						
2. Meetings with DFO Science staff						
3. FRCC consultations						

Suggestions to improve information exchange: _____

_____

_____

IV. Resource Outlook

For the Georges' Bank groundfish stocks, the FRCC is currently working on developing a set of criteria for longer-term stock conservation and growth. These include: (1) recommending quotas below the $F_{0.1}$ level; (2) setting stock specific spawning stock biomass targets; and (3) accepting low probabilities for year-over-over possible decline in the spawning stock biomass. In the future the FRCC will be consulting DFO and the fishing industry to develop longer-term plans for the Georges' Bank groundfish stocks. We invite you to provide preliminary feedback on the planning process, and criteria for stock conservation and growth.

How important do you consider the following elements for effective longer-term planning for the Georges' Bank groundfish stocks?

Planning elements	Very important	Somewhat important	Uncertain	Less important	Not at all important	No comment/ Don't know
1. Multi-year TACs, e.g., setting TACs for 3 to 5 years running						
2. Biological objectives, e.g., absolute biomass limits and targets						
3. Stock reference point values, e.g., $F_{0.1}$						
4. Ecosystem considerations, e.g., predators, prey, habitat						
5. Socioeconomic considerations, e.g., employment, income						
6. Limits on year-to-year changes in TACs, e.g., no change greater than +20% or –20%						
7. Other (please specify) _____ _____						

Suggestions for effective longer-term planning: _____

V. Respondent's Information

The following information is requested only to ensure data integrity and for data compilation purposes. This information will not be used in any way to identify the respondent and will remain confidential.

1. To what **fleet/gear sector** do you belong?

	FG less than 45'	FG 45'-65'	MG less than 65'	FG 65'-100'	MG 65'-100'	Vessels>100'
Fleet/Gear sector						

2. Please state your **home port and province**.

	Place name	Province
Home port		

3. What **Georges' Bank groundfish stocks** did you direct for in 2000? *(Check all that apply.)*

	5Zjm Cod	5Zjm Haddock	5Zjmnh Yellowtail flounder
Stocks fished			

4. In what **periods did you fish for Georges' Bank** groundfish in 2000? *(Check all months that you fished.)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Fishing periods												

5. How many **years experience** do you have fishing Georges' Bank groundfish stocks?

	One year	2 to 5 years	5 to 7 years	7 to 10 years	More than 10 years
Years experience					

Comments on this **questionnaire and suggestions for improving industry information** collection:

_____

_____

_____

_____

_____

Thank you for your valuable time in completing this questionnaire. Please send completed questionnaire to:

By FAX: (613) 998-1146
By mail: P.O. Box 2001, Station D, Ottawa, ON K1P 5W3
By e-mail: sheehant@dfo-mpo.gc.ca
By hand: FRCC Consultations, May 7,2001 in Pubnico

Appendix 2: FRCC Mandate and Membership

FRCC Terms of Reference

1. Introduction

The Government of Canada is committed to a more comprehensive approach to the conservation and management of our fisheries resource. This approach demands a better understanding of complex fisheries ecosystems - the interaction of fish with other species, predator-prey relationships, and also changes in the marine environment like ocean currents, water temperatures and salinity.

The Government of Canada is also committed to a more effective role in decision-making for those with practical experience and knowledge in the fishery.

The Minister of Fisheries and Oceans has established the Fisheries Resource Conservation Council (FRCC) as a partnership between government, the scientific community and the direct stakeholders in the fishery. Its mission is to contribute to the management of the Atlantic fisheries on a 'sustainable' basis by ensuring that stock assessments are conducted in a multi-disciplined and integrated fashion and that appropriate methodologies and approaches are employed; by reviewing these assessments together with other relevant information and recommending to the Minister total allowable catches (TACs) and other conservation measures, including some idea of the level of risk and uncertainty associated with these recommendations; and by advising on the appropriate priorities for science.

2. Definition of Conservation

Fisheries conservation is that aspect of the management of the fisheries resource which ensures that its use is sustainable and which safeguards its ecological processes and genetic diversity for the maintenance of the resource. Fisheries conservation ensures that the fullest sustainable advantage is derived from the resource and that the resource base is maintained.

3. Council Objectives

3.1 To help the government achieve its conservation, economic and social objectives for the fishery.The conservation objectives include, but are not restricted to:

3.1.1 rebuilding stocks to their 'optimum' levels and thereafter maintaining them at or near these levels, subject to natural fluctuations, and with 'sufficient' spawning biomass to allow a continuing strong production of young fish; and,

3.1.2 managing the pattern of fishing over the sizes and ages present in fish stocks and catching fish of optimal size.

3.2 To develop a more profound understanding of fish-producing ecosystems including the inter-relationships between species and the effects of changes in the marine environment on stocks.

3.3 To review scientific research, resource assessments and conservation proposals, including, where appropriate, through a process of public hearings.

3.4 To ensure that the operational and economic realities of the fishery, in addition to scientific stock assessments, are taken into account in recommending measures to achieve the conservation objectives.

3.5 To better integrate scientific expertise with the knowledge and experience of all sectors of the industry and thus develop a strong working partnership.

3.6 To provide a mechanism for public and industry advice and review of stock assessment information.

3.7 To make public recommendations to the Minister.

4. Mandate and Scope

4.1 The Fisheries Resource Conservation Council will address these objectives by bringing together industry, DFO science and fisheries management, and external scientific and economic expertise in one body.

4.2 The Council will:

4.2.1 advise the Minister on research and assessment priorities;

4.2.2 review DFO data and advise on methodologies;

4.2.3 consider conservation measures that may be required to protect fish stocks;

4.2.4 review stock assessment information and conservation proposals, including through public hearings, where appropriate; and,

4.2.5 make written public recommendations to the Minister on TACs and other conservation measures.

4.3 The Council may recommend any measures considered necessary and appropriate for conservation purposes such as TACs, closure of areas to fishing during specific periods, approaches to avoid catching sub-optimal sized fish or unwanted species, and restrictions on the characteristics or use of fishing gears.

4.4 The Council's scope includes Canadian fish stocks of the Atlantic and Eastern Arctic Oceans. In the first instance, the Council will address groundfish, and then subsequently take on responsibility for pelagic and shellfish species.

4.5 The Council may also advise the Minister on Canada's position with respect to straddling and transboundary stocks under the jurisdiction of international bodies such as the Northwest Atlantic Fisheries Organization (NAFO).

5. Size, Structure and Make-Up

5.1 The Council will consist of not more than 14 members with an appropriate balance between 'science' and 'industry'.

5.2 Members are chosen on merit and standing in the community, and not as representatives of organizations, areas or interests.

5.3 'Science' members, are drawn from government departments, universities or international posts, and are of an appropriate mix of disciplines, including fisheries management and economics.

5.4 'Industry' members are knowledgeable of fishing and the fishing industry and understand the operational and economic impacts of conservation decisions.

5.5 All members of the Council are appointed by the Minister.

5.6 All members, including the Chairperson, are appointed for a three year term; terms can be renewed.

5.7 Members appointed from DFO serve 'ex officio'.

5.8 Members have to disclose any interest in the Atlantic or Eastern Arctic fishery and take appropriate measures so as to avoid potential or real conflict of interest situations during the term of appointment.

5.9 The four Atlantic Provinces, Quebec and the Northwest Territories may each nominate one delegate to the Council. These delegates have access to the Council's information, and may participate fully in meetings, but will not be asked to officially endorse the formal recommendations to the Minister.

5.10 The Council is supported by a small Secretariat, to be located in Ottawa. The Secretariat will:

5.10.1 provide administrative support for the functioning of the Council;

5.10.2 provide a technical science and fisheries management support;

5.10.3 organize Council meetings;

5.10.4 record decisions of the Council;

5.10.5 undertake a professional communications function for the Council, providing a central point for communications to and from the Council; and

5.10.6 undertake such other matters as from time to time might be appropriate.

5.11 The Chairman may appoint an Executive Committee, consisting of the Chairman, Vice-Chairman, and three other Members.

5.12 In addition, the Chairman may, from time to time, strike an 'ad hoc' committee to deal with a specific issue.

6. Activities:

6.1 Reviews appropriate DFO science research programs and recommends priorities, objectives and resource requirements.

6.2 Considers scientific information - including biology, and physical and chemical oceanography, taking into account fisheries management, fishing practices, economics and enforcement information.

6.3 Conducts public hearings wherein scientific information is presented and/or proposed conservation measures/options are reviewed and discussed.

6.4 Recommends TACs and other conservation measures.

6.5 Prepares a comprehensive, long-term plan and a work plan for the Council which are reviewed annually at a workshop with international scientists and appropriate industry representatives.

6.6 Ensures an open and effective exchange of information with the fishing industry and contributes to a better public understanding of the conservation and management of Canada's fisheries resource.

FRCC MEMBERSHIP:

MEMBERS:

Fred Woodman, Chairman
Jean-Claude Brêthes, Vice-Chair
Maurice Beaudin
Bill Broderick
Bruce Chapman
Charlie Dennis
Jean Guy d'Entremont
Gabe Gregory
Nick Henneberry
Frank Hennessey
Dan Lane
Paul Nadeau
John Pope
George Rose

PROVINCIAL DELEGATES:

Ray Andrews, Nunavut
Mario Gaudet, New Brunswick
David MacEwen, Prince Edward Island
Dario Lemelin, Québec
Tom Dooley, Newfoundland and Labrador
Clary Reardon, Nova Scotia

EX OFFICIO:

Gilles Belzille
Barry Rashotte
Dave Gillis

SECRETARIAT:

Michel G. Vermette, Executive Director
Tracey Sheehan
Helena Da Costa
Debra Côté

200 Mile Fishing Zone and NAFO Fishing Boundaries